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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,960	06/24/2003	Shigeo Fujita	Q75539	8918
23373	7590	11/17/2005	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			RIELLEY, ELIZABETH A	
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 11/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/601,960

Applicant(s)

FUJITA ET AL.

Examiner

Elizabeth A. Rielley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-29 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Amendment filed 8/23/05 has been entered and considered by the Examiner. Currently, claims 1-29 are pending in the instant application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujita (JP 2000-164322).

In regard to claim 1, Fujita ('322) teaches a method for making a spark plug (W) having a center electrode (W1) disposed inside an insulator (not numbered), a metallic shell disposed outside the insulator (W3), and a ground electrode (W2) having a base end side connected to a leading end surface of the metallic shell and a leading end side bent so as to have a side surface that is opposed to a leading end surface of the center electrode to form there between a spark gap (G; claim 1), the method comprising the steps of: for adjustment of a spark gap of a spark plug work having the center electrode and the ground electrode, provisionally pressing the ground electrode of the spark plug work toward the leading end

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surface of the center electrode and thereby decreasing the spark gap to a predetermined value larger than a final target gap g_t ("test press" claim 1); after the step of provisionally pressing the ground electrode, performing an adjustment bending process for bending the ground electrode in the widthwise direction thereof so as to eliminate an eccentricity of the ground electrode with respect to a target position ("adjustment press process" claim 1); after the step of performing the adjustment bending process, measuring a spark gap g_1 of the spark plug work and measuring a difference ($g_1 - g_t$) between the measured spark gap g_1 and the final target gap g_t ("amount measurement process" claim 1); and pressing the ground electrode toward the center electrode when the difference ($g_1 - g_t$) is positive ("adjustment press process" claim 1).

In regard to claims 2, 3, 4, 5, and 15 Fujita ('322) teaches the step of performing the adjustment bending process comprises performing the adjustment bending process for ground electrodes of a plurality of spark plug works to adjust positions of the ground electrodes in the width direction thereof by adjustment amounts μ (u_1 ; claim 1) measuring resulting displacement amounts λ ($(g_1 - g_t)$; claim 2) of the ground electrodes in a pressed direction, finding the adjustment amount μ from an adjustment amount function $\mu = F(\lambda)$ that is a function of the displacement amount λ (claim 1 and 2), and finding, based on the adjustment amount function $\mu = F(\lambda)$, the adjustment amount μ necessary for eliminating the eccentricity δ of the ground electrode with respect to the target position (paragraph 4); updating sets of (μ, λ) data of the adjustment amount μ and the displacement amount λ by (μ, λ) data newly collected upon manufacture of the spark plug, and using while updating the adjustment amount function $\mu = F(\lambda)$ based on the updated sets of (μ, λ) data (claim 4); obtaining the adjustment amount function $\mu = F(\lambda)$ based on the sets of (μ, λ) data of all of the spark plug works preceding a present spark plug work immediately before a present spark plug work (claim 4 and 5).

In regard to claim 13, Fujita ('322) teaches the step of measuring the spark gap and the step of pressing the ground electrode are repeated until the spark gap is adjusted to the final target gap g_t (paragraphs 3 and 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita (JP 2000-164322).

In regard to claim 6, Fujita ('322) discloses all the limitations set forth, as described above, except using a least square regression formula for the data sets. However, the use of adjusting any function to a linear function by a least square regression of the data sets is well known in the art¹. Hence, it would have been obvious at the time of the invention to one of ordinary skill in the art to use a least square regression on a set of data in order to provide a linear function.

Claims 7-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita (JP 2000-164322) as applied to claim 1 above, and further in view of Nakatani et al (US 5741963).

In regard to claims 7 and 10, Fujita ('322) discloses all the limitations set forth, as described above, except prior to beginning of manufacture of the spark plug, obtaining an initial approximation function $\mu = F'(\lambda)$ as a function of n-th degree by using the sets of (μ, λ) data having been obtained

beforehand with respect to a predetermined n-number of spark plug works, and for the spark plug works till the n-th after beginning of manufacture, finding the adjustment amount μ from the initial approximation function $\mu=F'(\lambda)$; and for the spark plug works from n+1-th onward after beginning of manufacture, obtaining the adjustment amount function $\mu=F(\lambda)$ as a linear function of λ by the sets of (μ, λ) data of all of the spark plug works prior to a present spark plug work and finding the adjustment amount μ from the adjustment amount function $\mu=F(\lambda)$. Nakatani et al ('963) teach prior to beginning of manufacture of the spark plug (abstract; figure 6; column 4 line 50 to column 5 line 17), obtaining an initial approximation function $\mu=F'(\lambda)$ as a function of n-th degree by using the sets of (μ, λ) data having been obtained beforehand with respect to a predetermined n-number of spark plug works, and for the spark plug works till the n-th after beginning of manufacture, finding the adjustment amount μ from the initial approximation function $\mu=F'(\lambda)$; and for the spark plug works from n+1-th onward after beginning of manufacture (figure 7; column 5 line 18 – column 6 line 53) obtaining the adjustment amount function $\mu=F(\lambda)$ as a linear function of λ by the sets of (μ, λ) data of all of the spark plug works prior to a present spark plug work and finding the adjustment amount μ from the adjustment amount function $\mu=F(\lambda)$ (see figure 7) in order to improve the accuracy of the adjustment to the spark plug (abstract). Hence, it would have been obvious at the time of the invention to one of ordinary skill in the art to combine the method of manufacturing of Fujita with the step of obtaining initial data of Nakatani. Motivation to combine would be to improve the accuracy of the adjustment to the spark plug.

In regard to claims 8 and 11, Fujita ('322) discloses all the limitations set forth, as described above, except the step of obtaining the initial approximation function comprises preparing a required number of spark plug works for experiment, making adjustments of a plurality of predetermined adjustment amounts μ to the respective spark plug works to obtain resulting displacement amounts λ , and

¹ <http://www.stat.yale.edu/Courses/1997-98/101/linreg.htm>

obtaining, by least square regression of thus obtained sets of (μ, λ) data, the initial approximation function $\mu=F'(\lambda)$ as a linear function of λ . Nakatani teaches the step of obtaining the initial approximation function comprises preparing a required number of spark plug works for experiment, making adjustments of a plurality of predetermined adjustment amounts μ to the respective spark plug works to obtain resulting displacement amounts λ , and obtaining the initial approximation function $\mu=F'(\lambda)$ as a linear function of λ . (see figures 6 and 7; column 4 line 50 to column 6 line 53) in order to improve the accuracy of the adjustment to the spark plug (abstract). Hence, it would have been obvious at the time of the invention to one of ordinary skill in the art to combine the method of manufacturing of Fujita with the step of obtaining initial data of Nakatani. Motivation to combine would be to improve the accuracy of the adjustment to the spark plug.

Both Fujita and Nakatani are silent regarding the limitation of using a least square regression line for the data sets. However, the use of adjusting any function to a linear function by a least square regression of the data sets is well known in the art². Hence, it would have been obvious at the time of the invention to one of ordinary skill in the art to use a least square regression on a set of data in order to provide a linear function.

In regard to claims 9 and 12, Fujita/Nakatani discloses all the limitations set forth, as described above, except using the initial approximation function to obtain the initial approximation function as an inverse function of $\lambda= F(\mu)$. However, using a Fourier transformation and reverse transformation is well known in the art³. Hence, it would have been obvious at the time of the invention to one of ordinary skill in the art to use a Fourier transformation on the data to switch the independent and dependent variables.

² <http://www.stat.yale.edu/Courses/1997-98/101/linreg.htm>

In regard to claim 14, Fujita ('322) discloses all the limitations set forth, as described above, except performing the bending process based on an eccentricity δ to a final target deviation δt . Nakatani teaches performing the bending process based on an eccentricity δ to a final target deviation δt (figure 7) in order to improve the accuracy of the adjustment to the spark plug (abstract). Hence, it would have been obvious at the time of the invention to one of ordinary skill in the art to combine the method of manufacturing of Fujita with the focus on eccentricity of Nakatani. Motivation to combine would be to improve the accuracy of the adjustment to the spark plug.

Response to Arguments

Applicant's arguments filed 8/23/05 have been fully considered but they are not persuasive.

In regard to Applicant's argument that Fujita fails to disclose a step of for adjusting a spark gap in a widthwise direction, the Examiner respectfully disagrees. Fujita teaches performing an adjustment bending process for bending the ground electrode in the widthwise direction thereof so as to eliminate an eccentricity of the ground electrode with respect to a target position ("adjustment press process" claim 1) as show in figures 15-17. The first adjustment is done to calculate the spring back measurement; the electrode is pressed again to a measurement including the SB quantity, so that the target gap is reached (claim 1). As to the term "widthwise", one may say that the direction between the electrode and the pressing mechanism as shown in figure 16 is a "widthwise" direction.

³ <http://mathworld.wolfram.com/FourierTransform.html> and US patent 6592418.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth A. Rielley whose telephone number is 571-272-2117. The examiner can normally be reached on Monday - Friday 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available

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through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Elizabeth Rielley

Examiner
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JOSEPH WILLIAMS
PRIMARY EXAMINER